Effect of Streambed Disturbance on Benthic Communities- Literature Review

The temporary physical disturbance to a streambed caused by transmission line (i.e., natural gas) construction will likely have a short-term localized deleterious impact on benthic macroinvertebrate communities at the site of the disturbance. However, once the temporarily disturbed area is restored and re-watered, expected recolonization of the streambed should occur relatively quickly.

Often described as being in a state of "continuous redistribution", benthic macroinvertebrates have a natural propensity to recolonize cleared or disturbed areas via crawling, drifting, and oviposition (Townsend and Hilldrew, 1976). The rates of benthic macroinvertebrate recolonization depend on the size of the disturbed area as well as the proximity of a source of colonizers (e.g., upstream and downstream) and the distances the colonizers must travel. For example, small-scale reaches (e.g., <1 m^2) of disturbed substrates can be recolonized as quickly as in a few days (Giller and Campbell, 1989). Moreover, colonization of new stream channels is widely reported and often rapid. Malmqvist et al. (1991) reported that a new stream channel receiving pumped water from a nearby lake was rapidly colonized over the course of a few months, mainly by oviposition of flying adult aquatic invertebrates.

Rates of benthic recolonization also depend on the taxa, and their specific tendencies to move, via drifting, crawling and/or oviposition. Aquatic invertebrates with a high propensity to drift, such as Baetidae, Chironomidae and Simuliidae, will be among the first taxa to recolonize a disturbed streambed (Hemphill and Cooper, 1983; Ulfstrand et al., 1974; Gore, 1982). In streams with naturally low benthic community densities or colonization rates, drift may be the responsible route for a majority of the recolonization of disturbed substrates (Townsend and Hilldrew, 1976). Conversely, in streams with high benthic community densities, drifting as well as crawling from downgradient habitat, may be responsible for recolonization of disturbed substrates (Pearson and Jones, 1987; Giller and Campbell, 1989).

Cooper et al. (1990) suggested that one can rank colonization ability based on the relationship between colonization on empty substrate trays and local densities. In a study conducted on the South River (Virginia, USA), empty substrate trays were embedded in the streambed to evaluate benthic macroinvertebrate recolonization rates; after only 6 weeks, the benthic community composition on the recolonized substrate trays was significantly comparable to that of the resident substrates (URS, 2012).

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